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### (54) Signal supplying and receiving system

(57) An audio signal supplying device for supplying signals to an operating panel (3/4/5) for passenger provided in each of plural seats of a moving object, such as an aircraft or a train, in which the necessity of providing a dedicated adapter or headphone or a device of a complex structure may be eliminated to save costs.

The audio signal supplying device (1, 2) has plural operating units (3/4/5) for passengers. For example, an operating unit (3<sub>1</sub>) for the passenger has a demultiplexor (12) as a channel selection means for selecting a desired channel and a controller (6<sub>1</sub>) for inhibiting part of channel selection executed by the demultiplexor (12) and for canceling such partial inhibition of channel selection by the demultiplexor (12) responsive to a remote control signal received by a remote controlled light receiving unit (9<sub>1</sub>).

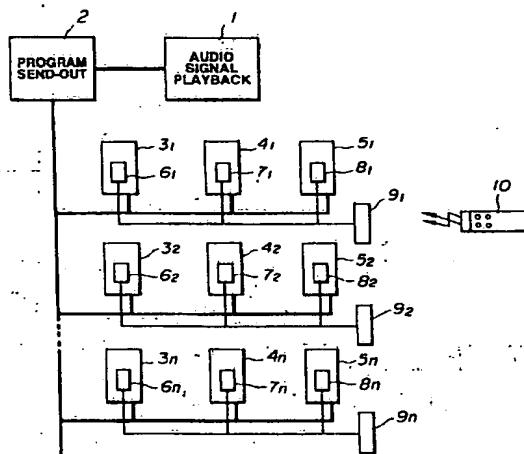


FIG.1

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It may also be contemplated to provide a card reader for e.g., a credit card for each seat to permit the payable program to be heard. Although this system saves the labor of the crew to collect the fee, while there is no risk of loss of the adapter, the device and the system become complex thus again raising the cost.

## SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a signal supplying and receiving system in which the dedicated adapter or the headphone as well as a complex device may be eliminated to realize low cost.

According to the present invention, there is provided a signal supplying/receiving system having an operating unit for a passenger provided in each of plural seats for passengers within a moving object (vehicle), and a supplying device for supplying signals to said operating unit. The signal supplying/receiving system includes selecting means for selecting an optional one of plural channels supplied from the supplying device, and control means for controlling the selection means for inhibiting selection of one or more channels among the plural channels. The control means also causing inhibition of selection of the one or more channels to be canceled responsive to a remote control signal received by a remote control signal receiving unit.

Preferably, the remote control signal includes a code specifying the cancellation of inhibition of selection of the one or more channels and an ID signal for identifying the seat.

Preferably, the control means selectively causes the inhibition, or the cancellation of inhibition, of selection of

passenger.

Fig.4 is a flow chart for illustrating the operation of the audio signal supplying device.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings; a preferred embodiment of the present invention will be explained in detail.

The illustrated embodiment is directed to an audio signal supplying device in which the signal supplying and receiving system according to the present invention is applied to an audio signal sending/receiving system configured for sending/receiving audio signals in an aircraft as the moving object. This audio signal supplying device has a payable channel and an ordinary non-payable channel. The payable channel furnishes a special program to the passenger subject to payment of a prescribed fee.

Referring to Fig.1, the audio signal supplying device of the illustrated embodiment includes an audio signal reproducing unit 1, such as a compact disc (CD) player or a tape recorder, and a program sending unit 2 for sending out audio signals from the audio signal reproducing unit 1 as a program. The audio signal supplying device also includes operating units for passengers 3<sub>1</sub>, 4<sub>1</sub>, 5<sub>1</sub>, 3<sub>2</sub>, 4<sub>2</sub>, 5<sub>2</sub>, ..., 3<sub>n</sub>, 4<sub>n</sub> and 5<sub>n</sub> arranged on arm rests of seats for three and having a selection switch for the passenger to select a desired channel, a sound volume switch or a headphone jack. The audio signal supplying device also includes control circuits 6<sub>1</sub>, 7<sub>1</sub> and 8<sub>1</sub> enclosed in the operating panels for passengers 3<sub>1</sub>, 4<sub>1</sub> and

5<sub>1</sub>, respectively, and a remote-controlled light-receiving unit 9<sub>1</sub> connected in common to the control circuits 6<sub>1</sub>, 7<sub>1</sub> and 8<sub>1</sub> so as to be used as a remote-control signal receiving unit. The audio signal supplying device also includes a remote-controlled light-receiving unit 9<sub>2</sub> connected in common to the control circuits 6<sub>2</sub>, 7<sub>2</sub> and 8<sub>2</sub> enclosed within the operating units for passengers 3<sub>2</sub>, 4<sub>2</sub> and 5<sub>2</sub> and a remote-controlled light-receiving unit 9<sub>n</sub> connected in common to the control circuits 6<sub>n</sub>, 7<sub>n</sub> and 8<sub>n</sub> enclosed within the operating units for passengers 3<sub>n</sub>, 4<sub>n</sub> and 5<sub>n</sub>. It is a remote controlling unit 10 that sends out a remote-control signal of an infrared light beam to these remote-controlled light receiving units 9<sub>1</sub>, 9<sub>2</sub>, ..., 9<sub>n</sub>.

The operating units for passengers 3<sub>1</sub>, 4<sub>1</sub> and 5<sub>1</sub> are arranged on arm rests of a seat for three 11, as shown in Fig.2. The remote controlled light receiving unit 9<sub>1</sub> is arranged in the vicinity of the operating unit for the passenger 3<sub>1</sub>. Thus the remote-controlled light receiving units 9<sub>1</sub>, 9<sub>2</sub>, ..., 9<sub>n</sub> are provided for groups of a pre-set number of seats, herein three seats.

The operating unit for the passenger 3<sub>1</sub>, for example, includes a demultiplexor 12, as selecting means for selecting a desired channel, and the controller 6<sub>1</sub> for inhibiting part of channel selection executed by the demultiplexor 12 and for canceling partial inhibition of channel selection of the demultiplexor 12 responsive to the remote-controlling operating signal received by the remote controlled light receiving unit 9<sub>1</sub>, as shown in Fig.3. The operating unit for the passenger 3<sub>1</sub> also includes a digital/analog (D/A) converter 13 for converting digital audio data from the demultiplexor 12 into analog audio data, an amplifier for amplifying the analog audio data via a headphone 17 to a level that can be heard by the passenger and a switch panel 16 for switch actuation by the passenger and for indicating a channel number.

The controller 6<sub>1</sub> is fed via remote controlled light receiving unit 9<sub>1</sub> with a remote-controlling signal sent from the remote controlling unit 10.

The number of channels that can be offered for the audio signal sending/receiving system is 10 (channels 1 to 10), of which the channels 1 to 8 are free of charge and the channels 9 and 10 are payable channels. The operation of the illustrated embodiment is explained with reference to the flow chart of Fig.4.

Plural sorts of audio data reproduced by the audio signal reproducing unit 1 are sent to the program sending unit 2 which digitizes and multiplexes these plural sorts of audio data. The digitized and multiplexed audio data are supplied to the plural operating units for passengers.

It is assumed that the passenger actuates a channel selection key of the switch panel 16 in order to select a desired channel. If the passenger actuates the channel selection key on the switch panel 16, the controller 6<sub>1</sub> sends a command to the demultiplexor 12 to take out data of the desired channel.

For normal operation, the channels 1 to 8 free of charge can be selected, as indicated at step S1. If a passenger desires a payable program of the channel 9 or

10, he or she pays the fee to the crew in charge. The crew receiving the fee directs a light-emitting section of the remote operating unit 10 to e.g., the remote controlled light receiving unit 9<sub>1</sub> and enters the information of identification of the seat of the passenger desiring to hear the payable channel, while actuating a key in order to permit the payable channel to be heard.

The controller 6<sub>1</sub> then first judges whether or not there has been entered any remote controlled input at step S2. If it is judged that the remote controlled input has been entered, the controller transfers to step S3 in order to judge whether or not an ID as the seat recognition information of the input remote controlling signal coincides with an ID of the seat. If the result of judgment at step S2 is NO, that is if it is judged that no remote controlled input has been entered, the controller reverts to step S1.

If the result of judgment at step S3 is YES, that is if the ID of the seat is coincident with that of the input data, the controller 6<sub>1</sub> transfers to step S4 in order to judge whether or not the input data is a code enabling the payable channel to be heard. If the result of judgment at step S3 is NO, that is if the ID of the seat is not coincident with that of the input data, the controller 6<sub>1</sub> reverts to step S1.

If the result at step S4 is YES, that is if the input data is a code permitting the payable channel to be heard, the controller 6<sub>1</sub> transfers to step S5 in order to enlarge the channel selection to a range from channel 1 to channel 10. If the result of judgment at step S4 is NO, that is if the input data is judged not to be the code for permission of the payable channel, the controller reverts to step S1.

Since the channel selection has been expanded at step S5, the passenger is able to hear the payable program of the channel 9 or 10 responsive to actuation of the channel selection key on the switch panel 16.

The controller 6<sub>1</sub> then judges at step S6 whether or not any remote-controlling input has been entered. This is done by the crew judging after the end of the payable program or on the passenger's request whether or not there has been any remote control input with the aid of the remote control unit 10. If the result of judgment is YES, that is if it has been judged that a remote control input has been entered, the controller transfers to step S7 in order to judge whether or not the ID of the input data is coincident with the ID of the seat.

If it is judged at step S6 that no remote control input has been entered, the controller reverts to step S5.

If the result of judgment at step S7 is YES, that is if the controller 6<sub>1</sub> judges that the ID of the input data coincides with the ID of the seat, the controller transfers to step S8 in order to judge whether or not the input data is a code which disables the payable channel to be heard. Conversely, if the result of judgment at step S7 is NO, that is if the controller 6<sub>1</sub> judges that the ID of the input data is not coincident with the ID of the seat, the controller reverts to step S5.

If the result of judgment at step S8 is YES, that is if the controller 6<sub>1</sub> judges that the input data is a code

which disables the payable channel to be heard, the controller transfers to step S9 in order to inhibit selection of the channel 9 or 10 as the payable channel to leave only the normal operation shown at step S1. Conversely, if the result of judgment at step S8 is NO, that is if the controller 6<sub>1</sub> judges that the input data is not a code which disables the payable channel to be heard, the controller reverts to step S5.

Since the channel selection at step S8 is reduced at step S8, the passenger is unable to receive the program of the chargeable channel 9 or 10.

With the illustrated embodiment, a sole remote control unit 10 suffices in order to control the totality of the seats. On the other hand, since the operation is carried out by only the crew, there is no risk of loss of the remote control device.

On the other hand, the remote controlled light receiving unit 9<sub>1</sub> supplies a common remote control signal to the operating units for passengers 3<sub>1</sub>, 4<sub>1</sub> and 5<sub>1</sub> and to the control circuits 6<sub>1</sub>, 7<sub>1</sub> and 8<sub>1</sub> of the group of seats. That is, there is no necessity of providing the remote controlled light receiving unit in each seat.

The remote control signal includes the information for identifying the seats of the groups of seats. For example, if the seat is the seat for three, the information may be the information "aisle", "window" and "center". Thus the operating units for passengers 3<sub>1</sub>, 4<sub>1</sub> or 5<sub>1</sub> cause the associated control circuit 6<sub>1</sub>, 7<sub>1</sub> or 8<sub>1</sub> to cancel partial inhibition of selection of the demultiplexor 12 to offer audio signals from the payable channel to the passenger if the information for identifying the seats of the group of seats contained in the remote control information coincides with the own information for identification.

If the operating unit for passenger 3<sub>1</sub> is provided on the window side seat, and the passenger seated in this window side seat desires to hear the program of the channel 10, that is the payable channel, the signal supplying device of the illustrated embodiment operates as follows:

The passenger seated in the window side seat tells the crew that he or she is desirous to hear the program of the channel 10 which is the payable channel. The crew then brings the remote controlling unit 10 close to the remote controlled light receiving unit 9<sub>1</sub> and presses the switch having the indication "WINDOW" thereon. The remote controlling signal generated by the remote controlling device 10 includes the information for canceling the selective inhibition of the demultiplexor 12 in addition to the information for identifying the window side operating unit for passenger 3<sub>1</sub>. This remote control signal is supplied via remote controlled light receiving unit 9<sub>1</sub> to the controller 6<sub>1</sub> of the operating unit for passenger 3<sub>1</sub> designated as being the window side. The controller 6<sub>1</sub> is also supplied with the information on the selection of the channel 10 as selected by the passenger on the switch panel 16. The controller 6<sub>1</sub> is responsive to the 10-channel select information from the switch panel 16 and the remote control signal from the remote controlled light re-

ceiving unit 9<sub>1</sub> to cancel the selective inhibition of the channel 10 of the demultiplexor 12. Thus the passenger seated in the window-side seat fitted with the operating unit for passenger 3<sub>1</sub> is able to receive the program of the channel 10 which is the payable channel.

With the above-described audio signal supplying device of the illustrated embodiment, since the control circuits 6<sub>1</sub>, 7<sub>1</sub>, 8<sub>1</sub>, 6<sub>2</sub>, 7<sub>2</sub> and 8<sub>2</sub>, ..., 6<sub>n</sub>, 7<sub>n</sub>, 8<sub>n</sub> within the operating units for passengers 3<sub>1</sub>, 4<sub>1</sub>, 5<sub>1</sub>, 3<sub>2</sub>, 4<sub>2</sub>, 5<sub>2</sub>, ..., 3<sub>n</sub>, 4<sub>n</sub> and 5<sub>n</sub> provided for respective seats, are responsive to a remote controlling actuating signal received by the remote controlled light receiving units 9<sub>1</sub>, 9<sub>2</sub>, ..., 9<sub>n</sub> to cancel the selective inhibition of the demultiplexor operating as channel selection inhibiting means within the passenger actuating unit, there is no necessity of providing a dedicated adapter or headphone or complex device, thus realizing low costs. On the other hand, since a sole remote control device is able to control the operation for respective seats while there is no necessity of providing the remote-controlled light receiving units for respective seats, and the operation of the remote control unit is executed by only the crew, the remote control device becomes easier to manage for further lowering the cost.

The present invention is not limited to the above-described embodiment of the signal supplying device. For example, the signal applying device may be applied for supplying picture or other information signals, in addition to audio signals.

On the other hand, the signal supplying device of the present invention is applicable not only to the audio signal sending/receiving device within the aircraft, but to similar devices in other moving objects, such as trains. Of course, picture signals or other signals may also be supplied within these other moving objects.

Furthermore, the control circuits 6<sub>1</sub>, 7<sub>1</sub>, 8<sub>1</sub>, ..., etc. may be adapted to permit the passenger access to the payable channels for an initial period of time in order to enable him to decide whether or not he wishes to pay for continued access to those channels. In such a case, if the passenger does not pay for continued access to the payable channels then the respective control circuit cuts off access to those channels either after a set period of time or in response to a remote-controlling signal received via the appropriate remote-controlled light receiving unit.

### Claims

1. A signal supplying/receiving system having an operating unit (3/4/5) for a passenger provided in each of plural seats for passengers within a moving object (vehicle), and a supplying device (1, 2) for supplying signals to said operating unit, comprising:

selecting means (12) for selecting an optional one of plural channels supplied from said supplying device (1, 2); and

controlling means (6/7/8) for controlling said selection means (12) for inhibiting selection of one or more channels among said plural channels; said controlling means (6/7/8) also causing inhibition of selection of said one or more channels to be canceled responsive to a remote controlling signal received by a remote controlled signal-receiving unit (9).

2. The signal supplying/receiving system as claimed in claim 1, wherein said remote controlling signal includes a code specifying the cancellation of inhibition of selection of said one or more channels and an ID signal for identifying said seat.

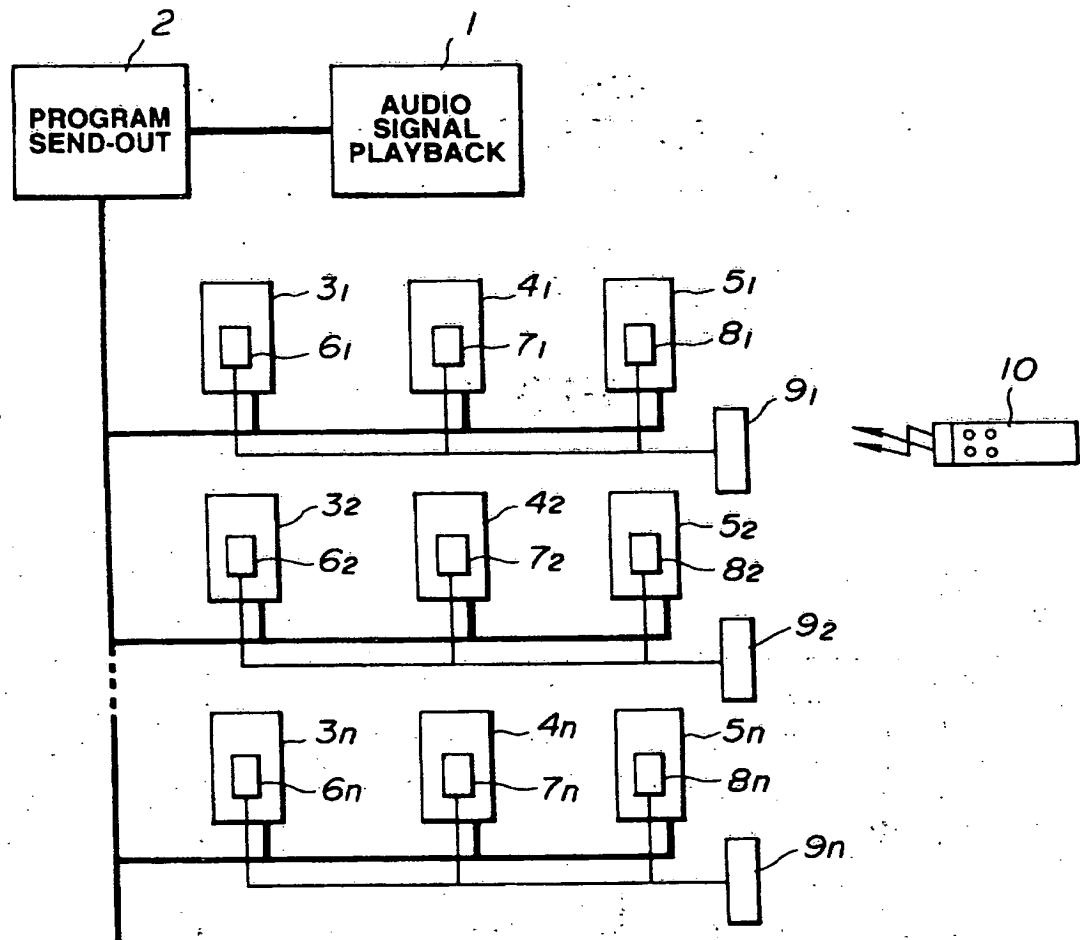
3. The signal supplying/receiving system as claimed in claim 2, wherein said controlling means (6/7/8) causes the inhibition of selection of said one or more channels by said selection means (12) of an operating unit (3/4/5) for the passenger when a seat specified by the ID signal included in said remote controlling actuating signal is coincident with said operating unit (3/4/5) for the passenger associated with the control unit (6/7/8).

4. The signal supplying/receiving system as claimed in claim 1, wherein said remote controlling signal is an infra-red light beam emitted by a remote controller (10).

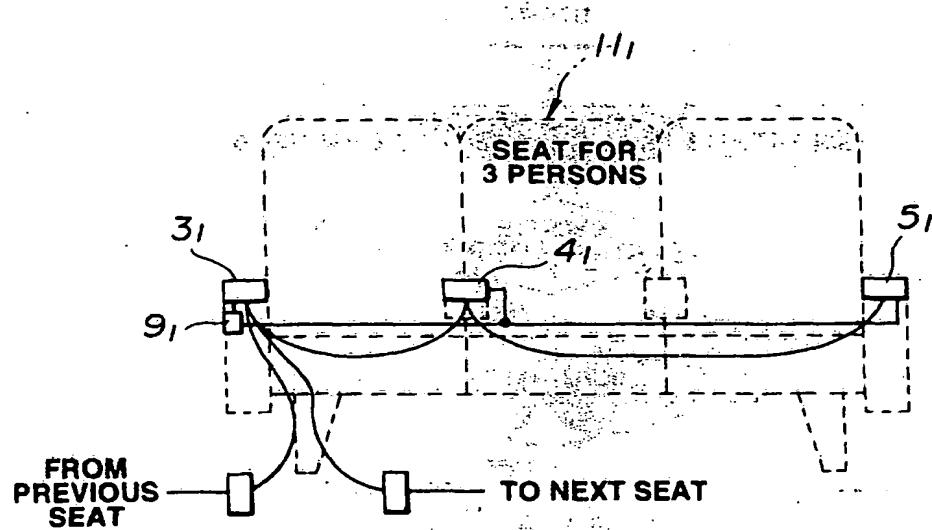
5. The signal supplying/receiving system as claimed in claim 1, wherein said remote controlling signal receiving unit (9) is provided for each of groups of seats (11) made up of a plurality of said seats.

6. The signal supplying/receiving system as claimed in claim 1, further comprising an actuating panel (16); said selection means (12) selecting a channel selected by a passenger via said actuating panel.

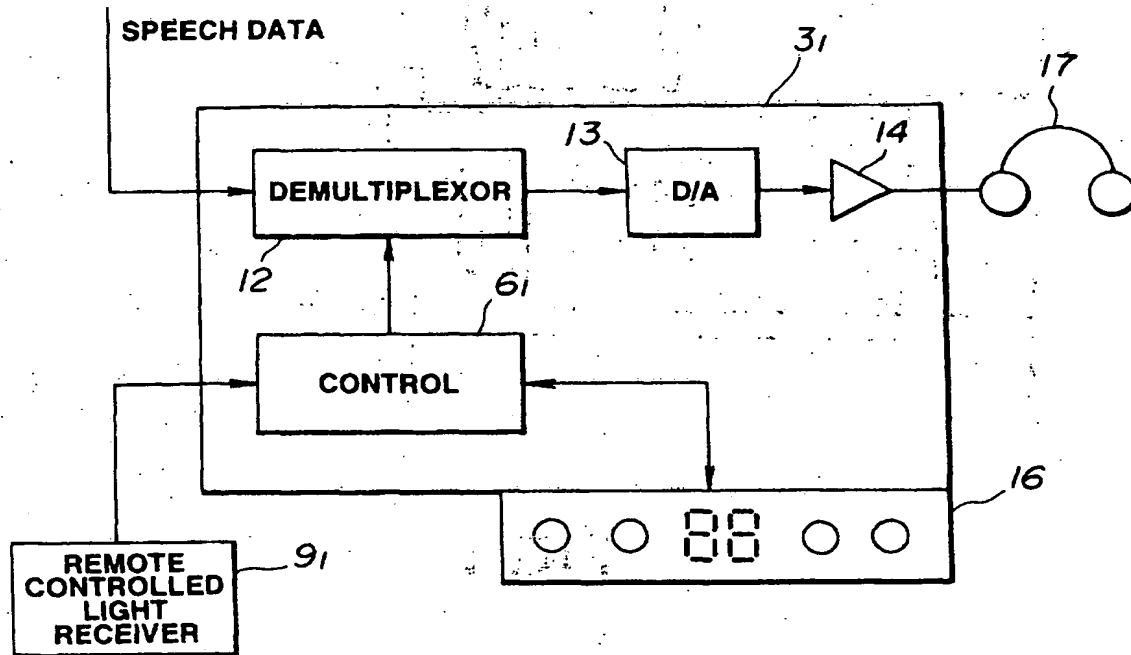
7. The signal supplying/receiving system as claimed in claim 1; wherein the signals supplied from said supplying device (1, 2) are audio signals.



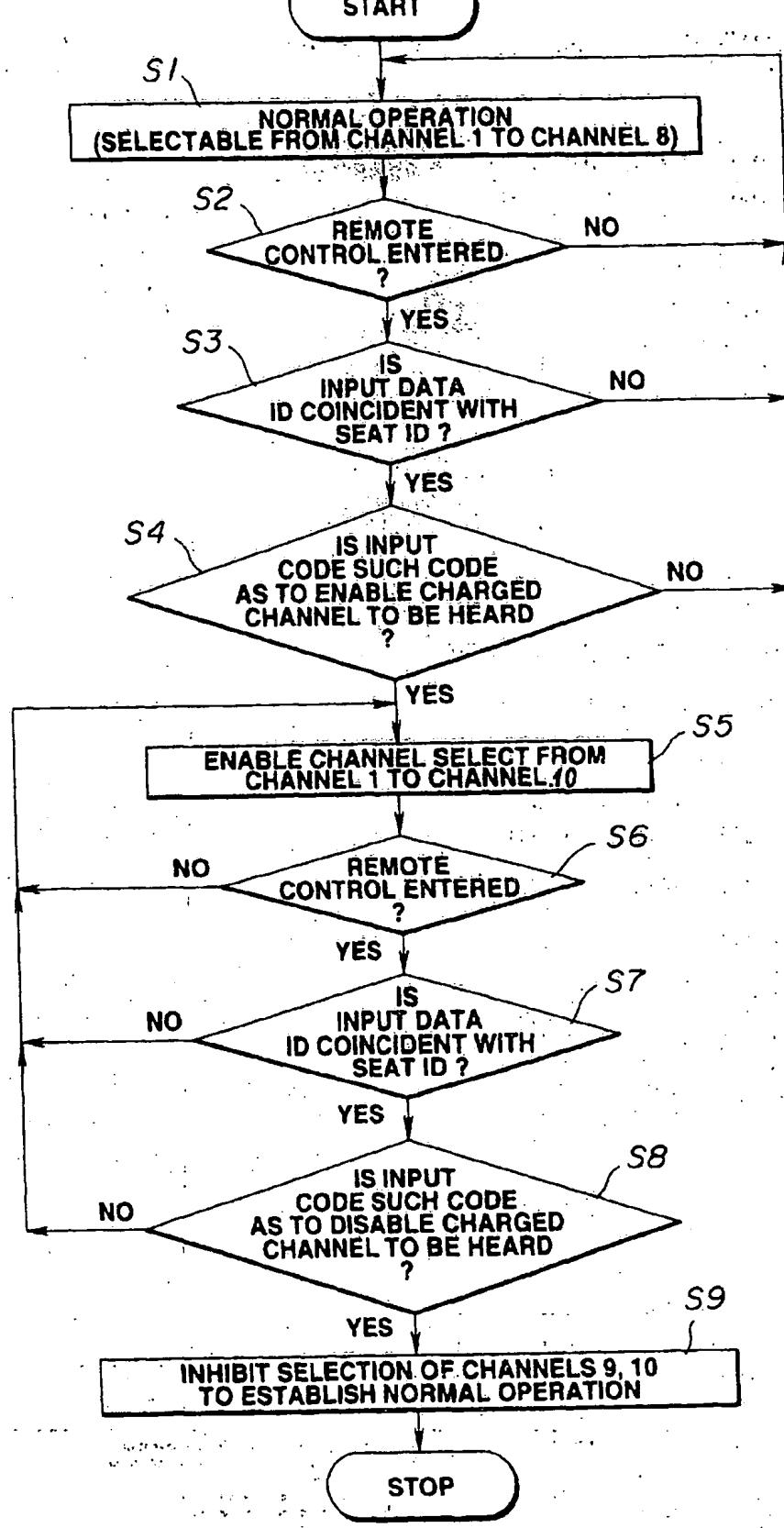
**FIG.1**



**FIG.2**



**FIG.3**



**FIG. 4**



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## EUROPEAN SEARCH REPORT

Application Number:

EP 95 40 2184

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
7 X	EP-A-0 282 183 (SONY CORP) 14 September 1988	1	HO4H1/04 B64D11/00 HO4N7/16						
A	* column 5, line 33 - column 6, line 45 * * column 7, line 23 - column 8, line 49 * * column 9, line 3 - line 16 * * column 9, line 40 - column 10, line 3 * ---	2-7							
1 A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 091 (M-0938) ,20 February 1990 & JP-A-01 301430 (SONY CORP) 5 December 1989, * abstract * * figures 4,5 *	1-7							
7 A	EP-A-0 416 455 (GEN INSTRUMENT CORP) 13 March 1991 * column 2, line 16 - line 20 * * column 2, line 38 - line 49 * * column 3, line 9 - line 35 *	4							
1 A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 091 (M-0938) ,20 February 1990 & JP-A-01 301431 (SONY CORP) 5 December 1989, * abstract *	5	TECHNICAL FIELDS SEARCHED (Int.Cl.6)						
1 A	PATENT ABSTRACTS OF JAPAN vol. 014 no. 018 (E-873) ,16 January 1990 & JP-A-01 260951 (SONY CORP) 18 October 1989, * abstract *	5	HO4N B64D HO4H						
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<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>22 January 1996</td> <td>Goulding, C</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	22 January 1996	Goulding, C
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# EUROPEAN SEARCH REPORT

Application Number

EP 95 40 2184

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)
A	PATENT ABSTRACTS OF JAPAN vol. 012 no. 474 (E-692) , 12 December 1988 & JP-A-63 191491 (SONY CORP) 8 August 1988, * abstract *	6	
The present search report has been drawn up for all claims			
Place of search Date of completion of the search Examiner			
THE HAGUE		22 January 1996	Goulding, C
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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